

## SONY. SERVICE MANUAL

*AEP Model  
UK Model  
Singapore Model  
Tourist Model*

### SUPPLEMENT-1

File this supplement with the service manual.

**Subject : 1. TEST MODE  
2. ELECTRICAL ADJUSTMENT  
3. BLOCK DIAGRAM**

There are some mistakes for the panel name of CLOCK SET.

Please correct the followings.

Page	INCORRECT	CORRECT
3	18 CLOCK SET button	18 SCROLL button
46	S763 CLOCK SET	S763 SCROLL
49	S763 CLOCK SET	S763 SCROLL
63	S763 SWITCH, TACTILE (CLOCK SET)	S763 SWITCH, TACTILE (SCROLL)



SECTION 1

TEST MODE

1-1. Setting the Test Mode

While pressing the AMS knob, insert the power plug into the power supply inlet, and release the AMS knob.

1-2. Exiting the Test Mode

Disconnect the power plug from the power supply inlet.

1-3. Basic Operations of the Test Mode

All operations are performed using the AMS knob, YES key, and NO key.  
The functions of these keys are as follows.

Function	Contents
AMS knob	Changes parameters and modes
YES key	Proceeds onto the next step. Finalizes input.
NO key	Returns to previous step. Stops operations.

1-4. Selecting the Test Mode

Eight test modes are selected by turning the AMS knob.

Display	Contents
TEMP ADJUST	Temperature compensation offset adjustment
LDPWR ADJUST	Laser power adjustment
EFBAL ADJUST	Traverse adjustment
FBIAS ADJUST	Focus bias adjustment
FBIAS CHECK	Focus bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous recording mode
EEP MODE	Non-volatile memory mode *

For detailed description of each adjustment mode, refer to 2. Electrical Adjustments.  
If a different adjustment mode has been selected by mistake, press the NO key to exit from it.  
\* The EEP MODE is not used in servicing. If set accidentally, press the NO key immediately to exit it.

1-4-1. Operating the Continuous Playback Mode

1. Entering the continuous playback mode
- ① Set the disc in the unit (either MO or CD).

② Rotate the AMS knob and display “CPLAY MODE”.

③ Press the YES key to change the display to “CPLAYIN”.

④ When access completes, the display changes to “CPLAY (0000)”.
- Note : The “0” displayed are arbitrary numbers.
2. Changing the parts to be played back
- ① Press the YES key during continuous playback to change the display to “CPLY MID”, “CPLAY OUT”.  
When pressed another time, the parts to be played back can be changed.

② When access completes, the display changes to “CPLAY (0000)”.
- Note : The “0” displayed are arbitrary numbers.
3. Ending the continuous playback mode
- ① Press the NO key. The display will change to “CPLY MODE”.

② Press the EJECT key and remove the disc.
- Note 1 : The playback start addresses for IN, MID, and OUT are as follows.
- IN 40h cluster

MID 300h cluster

OUT 700h cluster



## 1-4-2. Operating the Continuous Recording Mode

### 1. Entering the continuous recording mode

- ① Set the MO disc in the unit.
- ② Rotate the AMS knob and display "CREC MODE".
- ③ Press the YES key to change the display to "CREC IN".
- ④ When access completes, the display changes to "CREC (000)" and **REC** lights up.

**Note :** The "0" displayed are arbitrary numbers.

### 2. Changing the parts to be recorded

- ① When the YES key is pressed during continuous recording, the display changes to "CREC MID", "CREC OUT" and **REC** goes off.

When pressed another time, the parts to be recorded can be changed.

- ② When access completes, the display changes to "CREC (000)" and **REC** lights up.

**Note :** The "0" displayed are arbitrary numbers.

### 3. Ending the continuous recording mode

- ① Press the NO key. The display changes to "CREC MODE" and **REC** goes off.
- ② Press the EJECT key and remove the disc.

**Note 1 :** The recording start addresses for IN, MID, and OUT are as follows.

IN 40h cluster  
MID 300h cluster  
OUT 700h cluster

**Note 2 :** The NO key can be used to stop recording anytime.

**Note 3 :** During the test mode, the erasing-protection tab will not be detected. Therefore be careful not to set the continuous recording mode when a disc not to be erased is set in the unit.

**Note 4 :** Do not perform continuous recording for long periods of time above 5 minutes.

**Note 5 :** During continuous recording, be careful not to apply vibration.

## 1-4-3. Non-Volatile Memory Mode

This mode reads and writes the contents of the non-volatile memory.

It is not used in servicing. If set accidentally, press the NO key immediately to exit it.

## 1-5. Functions of Other keys

Function	Contents
▷ ◻	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶	The sled moves to the outer circumference only when this is pressed.
◀◀	The sled moves to the inner circumference only when this is pressed.
●	Turns recording ON/OFF when pressed during continuous playback.
SCROLL	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLVS and A).
DISPLAY	Switches the display when pressed. Returns to previous step. Stops operations.

**Note :** The erasing-protection tab is not detected during the test mode. Recording will start regardless of the position of the erasing-protection tab when the ● (REC) key is pressed.



## 1-6. Test Mode Displays

Each time the DISPLAY key is pressed, the display changes in the following order.

MODE display→Address display→Error rate display

1. MODE display  
Displays "TEMP ADJUST", "CPLAY MODE", etc.
2. Address display  
Addresses are displayed as follows.  
h = 0000 s = 0000 (MO pit and CD)  
h = 0000 a = 0000 (MO groove)  
h = : Header address  
s = : SUBQ address  
a = : ADIP address  
\* is displayed when the address cannot be read.
3. Error rate display  
Error rates are displayed as follows.  
C1 = 0000 AD = 0000  
C1 = : Indicates C1 error  
AD = : Indicates ADER

## 1-7. Meanings of Other Displays

Display	Contents		
	Light	Off	Blinking
▶	During continuous playback	STOP	
00	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Pit	Groove	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A. SPACE	ABCD adjustment completed		
A - B	(Focus auto gain successful) (Tracking auto gain successful)		(Focus auto gain successful) (Tracking auto gain failed)

## 1-8. Precautions for Use of Test Mode

- ① As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.  
Even if the EJECT key is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.  
Therefore, it will be ejected while rotating.  
Always press the NO key first before pressing the EJECT key.
- ② The erasing-protection tab is not detected in the test mode. Therefore, when modes which output the recording laser power such as continuous recording mode and traverse adjustment mode, etc. are set, the recorded contents will be erased regardless of the position of the tab. When using a disc that is not to be erased in the test mode, be careful not to enter the continuous recording mode and traverse adjustment mode.



## SECTION 2.

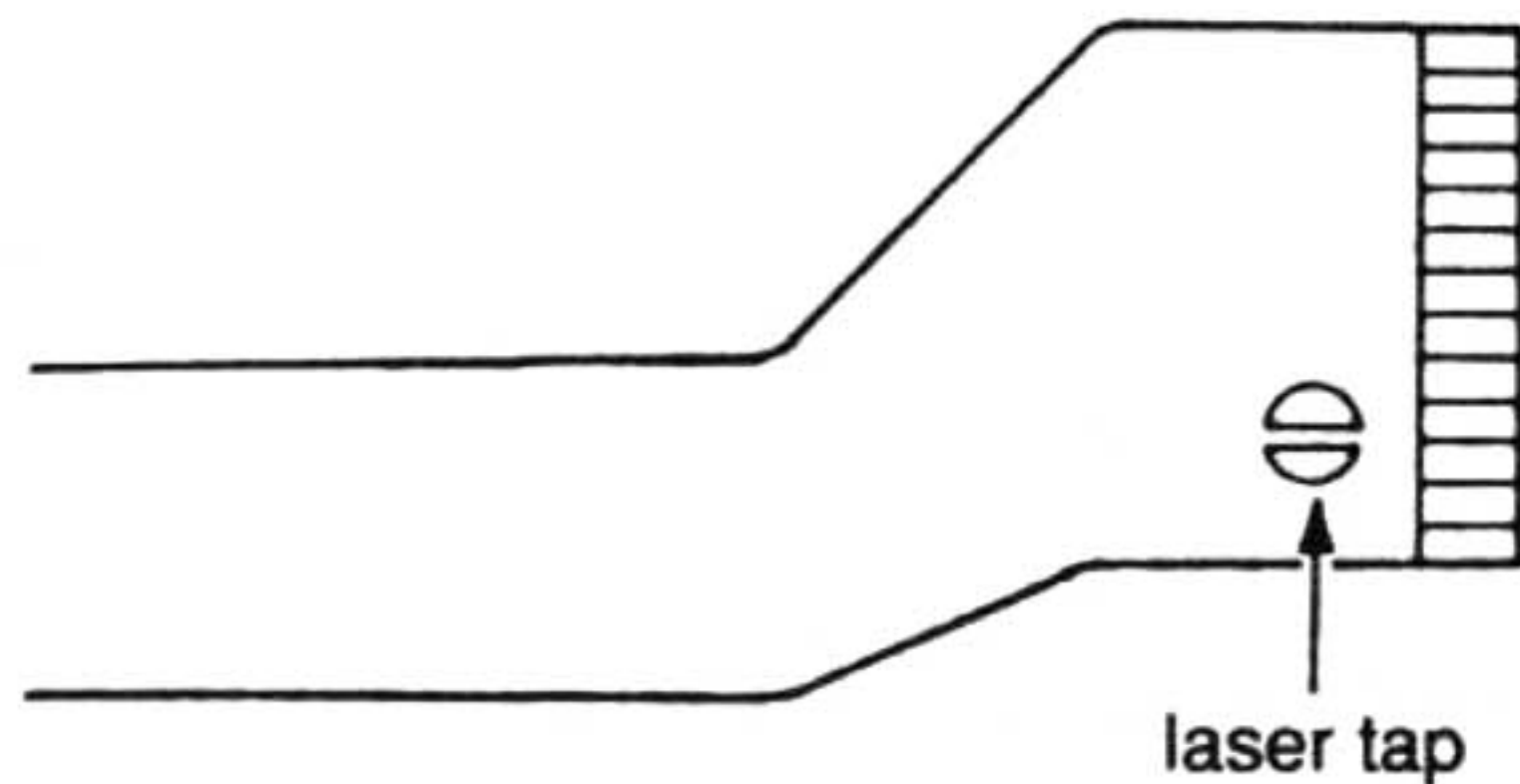
### ELECTRICAL ADJUSTMENTS

#### 2-1. Precautions for Checking Laser Diode Emission

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

#### 2-2. Precautions for Use of optical pickup (KMS-210A)

As the laser diode in the optical pickup is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



**Optical pickup flexible board**

#### 2-3. Precautions for Adjustments

- 1) When replacing the following parts, perform the adjustments and checks with ○ in the order shown in the following table.

	Optical Pickup	BD Board		
		IC171	D101	IC101, IC121, IC191
1. Temperature compensation offset adjustment	X	○	○	○
2. Laser power adjustment	○	X	X	○
3. Traverse adjustment	○	○	X	○
4. Focus bias adjustment	○	○	X	○
5. Error rate check	○	○	X	○

- 2) Set the test mode when performing adjustments. After completing the adjustments, exit the test mode.
- 3) Perform the adjustments in the order shown.
- 4) Use the following tools and measuring devices.
  - CD test disc TDYS-1 (Parts No. 4-963-646-01)
  - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
  - Oscilloscope
  - Digital voltmeter
  - Thermometer
- 5) When observing several signals on the oscilloscope, etc., make sure that VC and GND do not connect inside the oscilloscope. (VC and GND will become short-circuited.)
- 6) Do not move RV105 of the BD board. When replacing it, adjust to the mechanical center of the semi-fixed resistor.

#### 2-4. Creating MO Continuously Recorded Disc

- \* This disc is used in focus bias adjustment and error rate check. The following describes how to create a MO continuous recording disc.
1. Insert a MO disc (blank disc) commercially available.
  2. Rotate the AMS knob and display "CREC MODE".
  3. Press the YES key and display "CREC IN".
  4. Press the YES key again to display "CREC MID". "CREC (0300)" is displayed for a moment and recording starts.
  5. Complete recording within 5 minutes.
  6. Press the NO key and stop recording.
  7. Press the EJECT key and remove the MO disc.

The above has been how to create a continuous recording data for the focus bias adjustment and error rate check.

#### Note :

- Be careful not to apply vibration during continuous recording.



## 2-5. Temperature Compensation Offset Adjustment

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

### Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

### Adjusting Method :

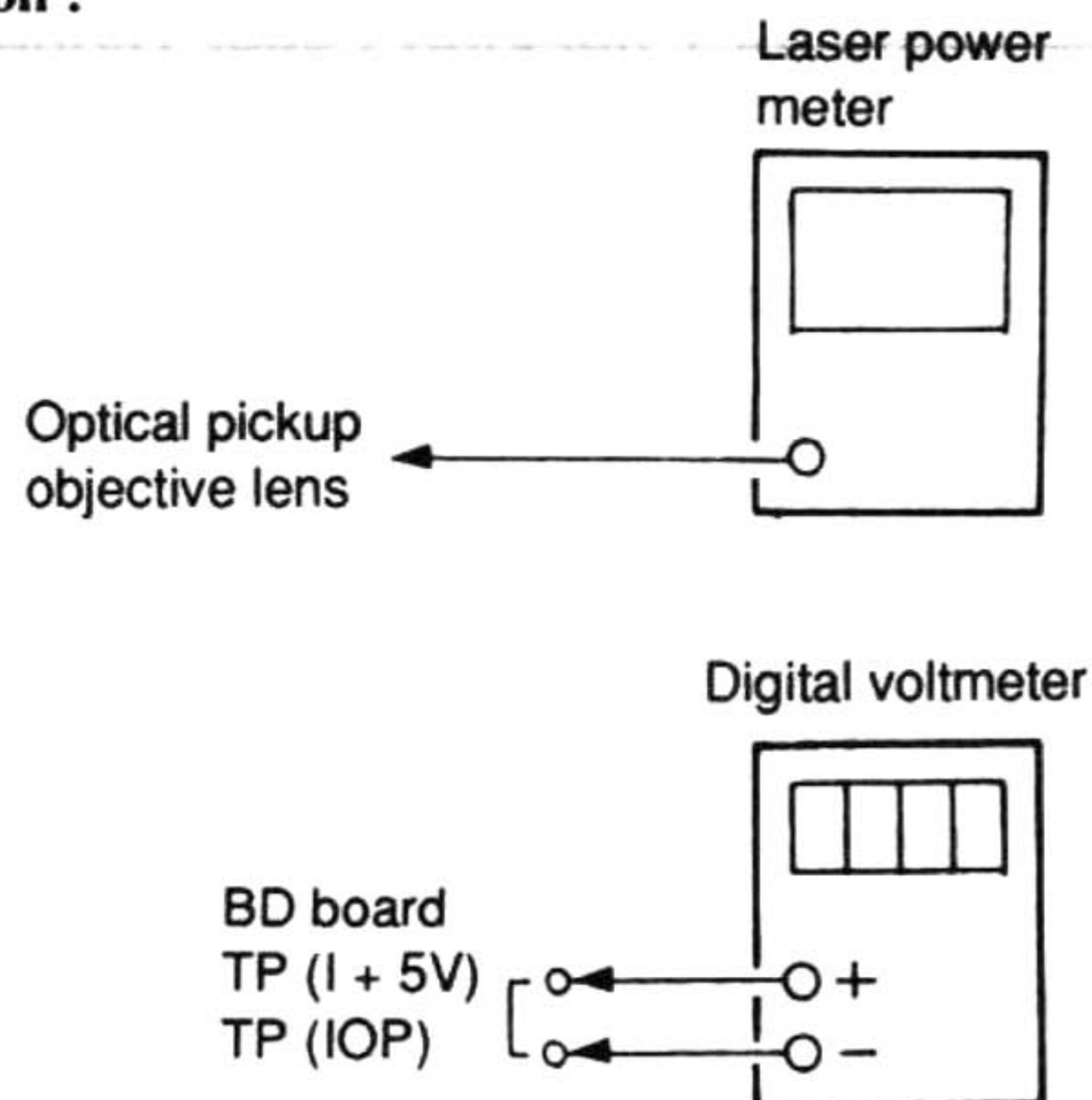
1. Rotate the AMS knob and display "TEMP ADJUST".
2. Press the YES key and select the "TEMP ADJUST" mode.
3. "TEMP = 00" and the current temperature data will be displayed.
4. To save the data, press the YES key.  
When not saving the data, press the NO key.
5. When the YES key is pressed, "TEMP = 00 SAVE" will be displayed for some time, followed by "TEMP ADJUST".  
When the NO key is pressed, "TEMP ADJUST" will be displayed.

### Specifications :

The temperature should be within "TEMP = E0" and "TEMP = 1F".

## 2-6. Laser Power Adjustment

### Connection :



### Adjusting Method :

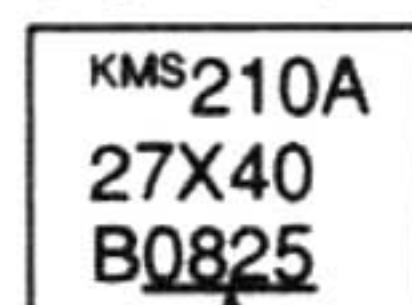
1. Set the laser power meter on the objective lens of the optical pickup. (When it cannot be set properly, press the ◀ key or ▶ key and move the optical pickup.)  
Connect the digital volt meter to TP (IOP) and TP (I+5V).
2. Rotate the AMS knob and display "LDPWRADJUST".  
(Laser power : For adjustment)
3. Press the YES key twice and display "LD \$ 4B = 3.5 mW".
4. Adjust RV102 of the BD board so that the reading of the laser power meter becomes  $3.4 \pm 0.1$  mW.
5. Press the YES key and display "LD \$ 96 = 7.0 mW".  
(Laser power:MO reading)
6. Check that the laser power meter and digital voltmeter readings satisfy the specified value.

### Specification :

Laser power meter reading :  $7.0 \pm 0.3$  mW

Digital voltmeter reading : Optical pickup displayed value  
 $\pm 10\%$

(Optical pickup label)



lop = 82.5 mA in this case

lop (mA) = Digital voltmeter reading (mV) / 1 (Ω)

7. Press the YES key and display "LD \$ 0F = 0.7 mW".  
(Laser power:MO reading)
8. Check that the laser power meter at this time satisfies the specified value.

### Specification :

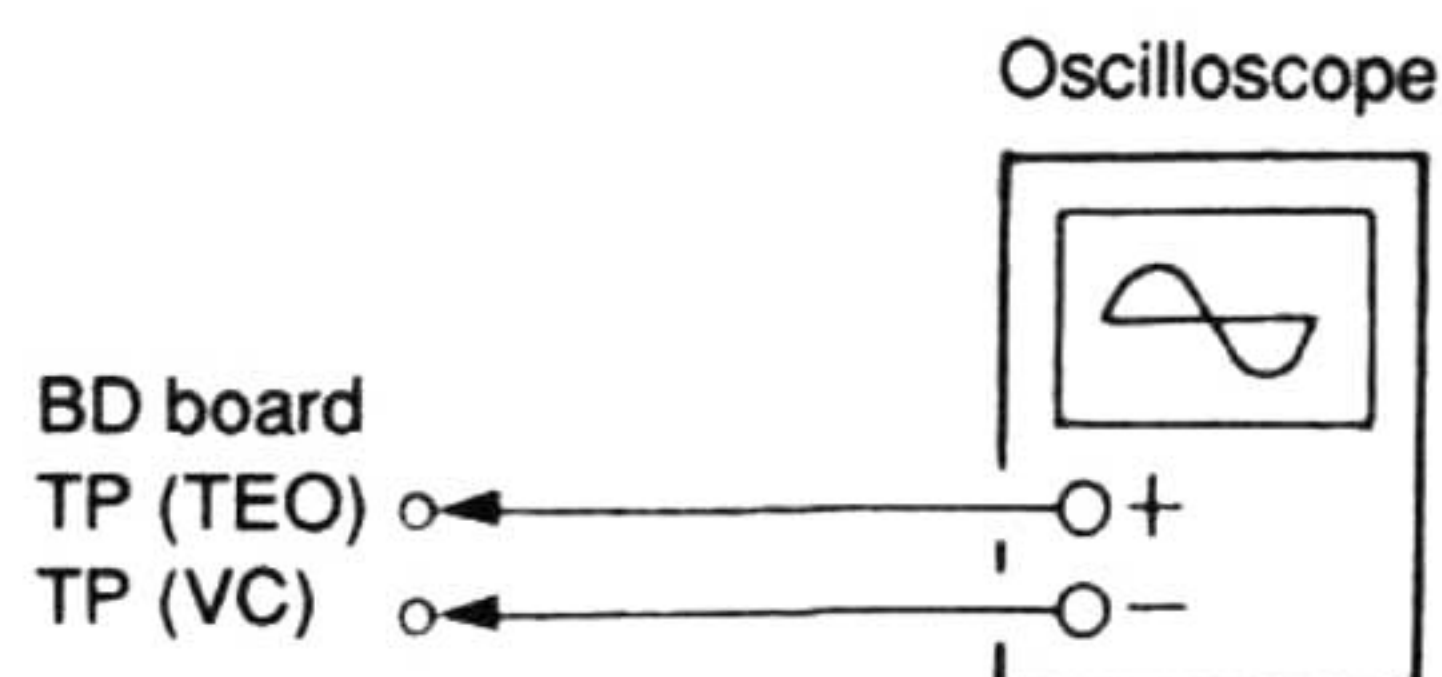
Laser power meter reading :  $0.70 \pm 0.1$  mW

9. Press the NO key and display "LDPWR ADJUST", and stop laser emission.  
(The NO key is effective at all times to stop the laser emission.)



## 2-7. Traverse Adjustment

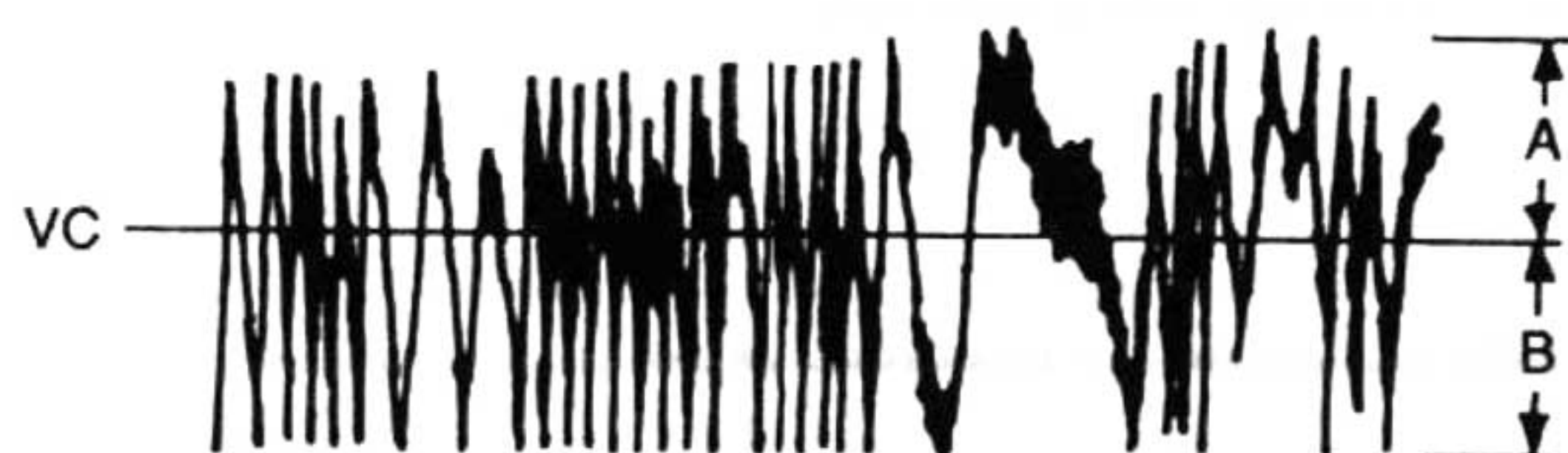
### Connection :



### Adjusting method :

1. Connect an oscilloscope to TP (TEO) and TP (VC) of the BD board.
2. Load a MO disc (any available on the market).
3. Press the ◀ key or ▶ key and move the optical pickup outside the pit.
4. Rotate the AMS knob and display "EFBAL ADJUST".
5. Press the YES key and display "EFBAL MO-W".  
(Laser power WRITE power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Adjust RV101 of the BD board so that the waveform of the oscilloscope becomes the specified value.  
(MO groove write power traverse adjustment)

(Traverse Waveform)



Specification A = B

7. Press the YES key and display "EFB = \$ MO-R".  
(Laser power : MO reading)
8. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value.  
(When the AMS knob is rotated, the \$ of "EFB-\$" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.  
(MO groove read power traverse adjustment)

(Traverse Waveform)



Specification A=B

9. Press the YES key, display "EFB = \$ SAVE" for a moment and save the adjustment results in the non-volatile memory.  
Next "EFBAL MO-P" is displayed.
10. Press the YES key and display "EFB = \$ MO-P".  
The optical pickup moves to the pit area automatically and servo is imposed.

11. Rotate the AMS knob until the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)



Specification A=B

12. Press the YES key, display "EFB = \$ SAVE" for a moment and save the adjustment results in the non-volatile memory.  
Next "EFBAL CD" is displayed. The disc stops rotating automatically.
13. Press the EJECT key and remove the MO disc.
14. Load the test disc TDYS-1.
15. Press the YES key and display "EFB = \$ CD". Servo is imposed automatically.
16. Rotate the AMS knob so that the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)

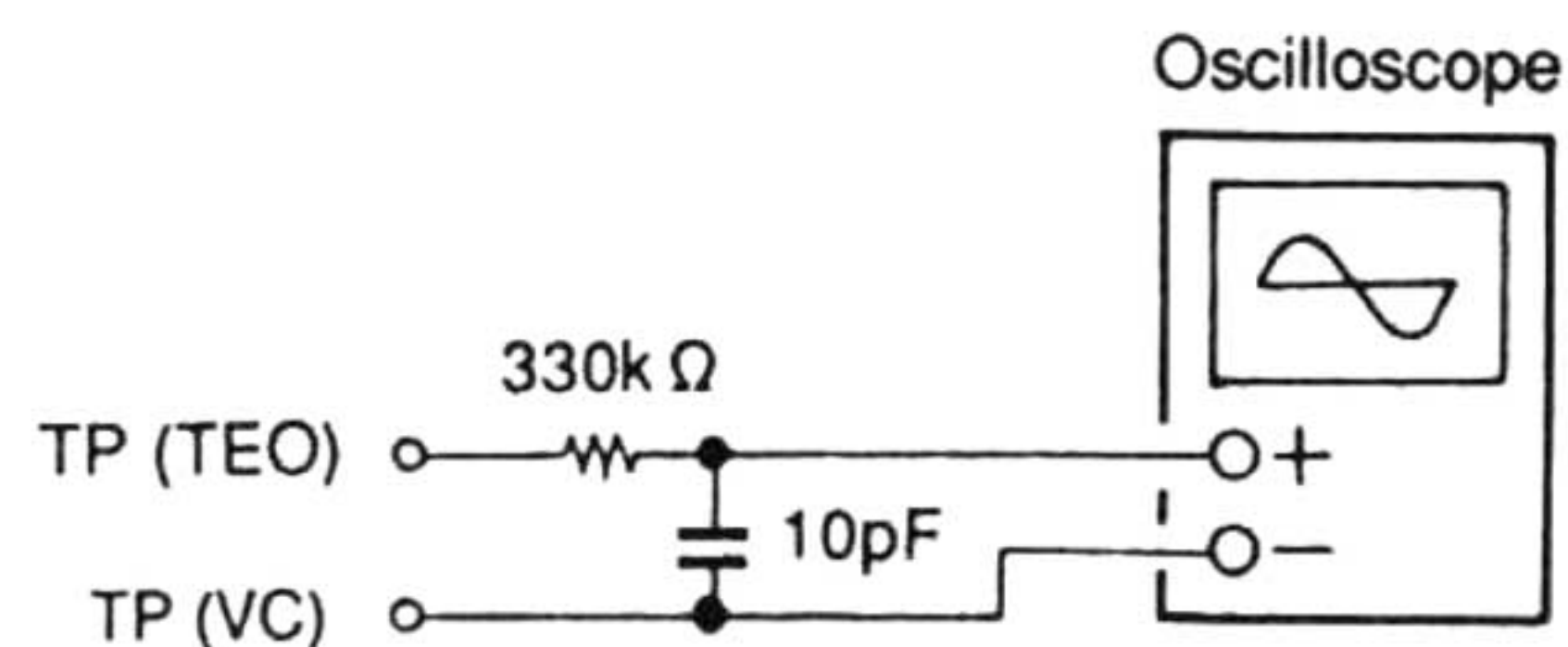


Specification A=B

17. Press the YES key, display "EFB = \$ SAVE" for a moment and save the adjustment results in the non-volatile memory.  
Next "EFBAL ADJUST" is displayed.
18. Press the EJECT key and remove the test disc TDYS-1.

**Note 1)** Data will be erased during MO reading if a recorded disc is used in this adjustment.

**Note 2)** If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.





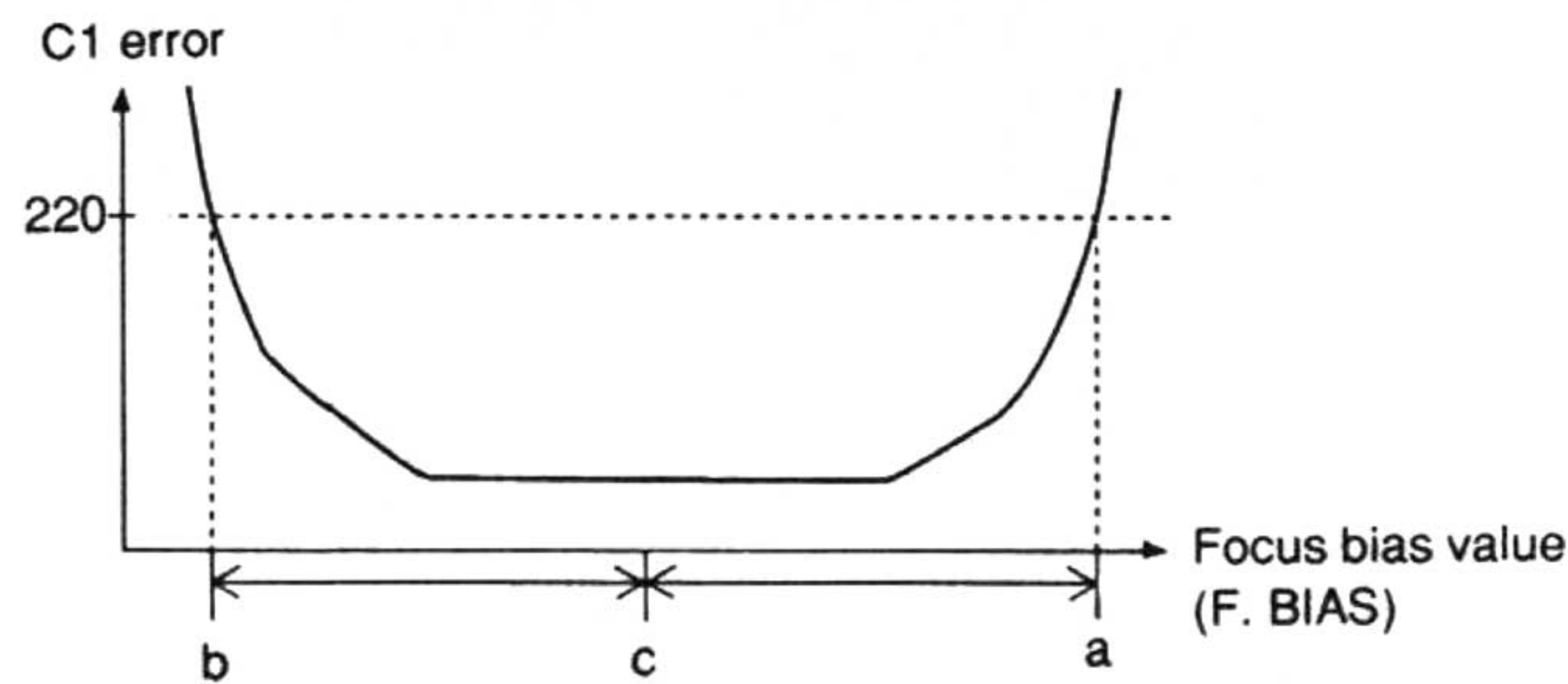
## 2-8. Focus Bias Adjustment

### Adjusting Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. Press the NO key when "CPLAY (0300)" is displayed.
5. Rotate the AMS knob and display "FBIAS ADJUST".
6. Press the YES key and display "C1 = 0000 AD = 00".  
The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the AMS knob in the clockwise direction and find the focus bias value at which the C1 error rate becomes 220.
8. Press the YES key and display "C1 = 0000 b = 00".
9. Rotate the AMS knob in the counterclockwise direction and find the focus bias value at which the C1 error rate becomes 220.
10. Press the YES key and display "C1 = 0000 c = 00".
11. Check that the C1 error rate is below 50 and ADER is 00. Then press the YES key.
12. If the "(00)" in "C1 - 00 - 00 (00)" is above 20, press the YES key.  
If below 20, press the NO key and repeat the adjustment from step 2 again.
13. Press the NO key and press the EJECT key to remove the continuously recorded disc.

**Note 1:** The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

**Note 2:** As the C1 error rate changes, perform the adjustment using the average value.



## 2-9. Error Rate Check

### 2-9-1. CD Error Rate Check

#### Checking Method :

1. Load a test disc TDYS-1.
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. When "CPLAY (0300)" is displayed, press the DISPLAY key twice and display "C1 = 0000 AD = 00".
5. Check that the C1 error rate is below 20.
6. Press the NO key, stop playback, press the EJECT key, and remove the test disc.

### 2-9-2. MO Error Rate Check

#### Checking Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. When "CPLAY (0300)" is displayed, press the DISPLAY key twice and display "C1 = 0000 AD = 00".
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the NO key, stop playback, press the EJECT key, and remove the continuously recorded disc.

## 2-10. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

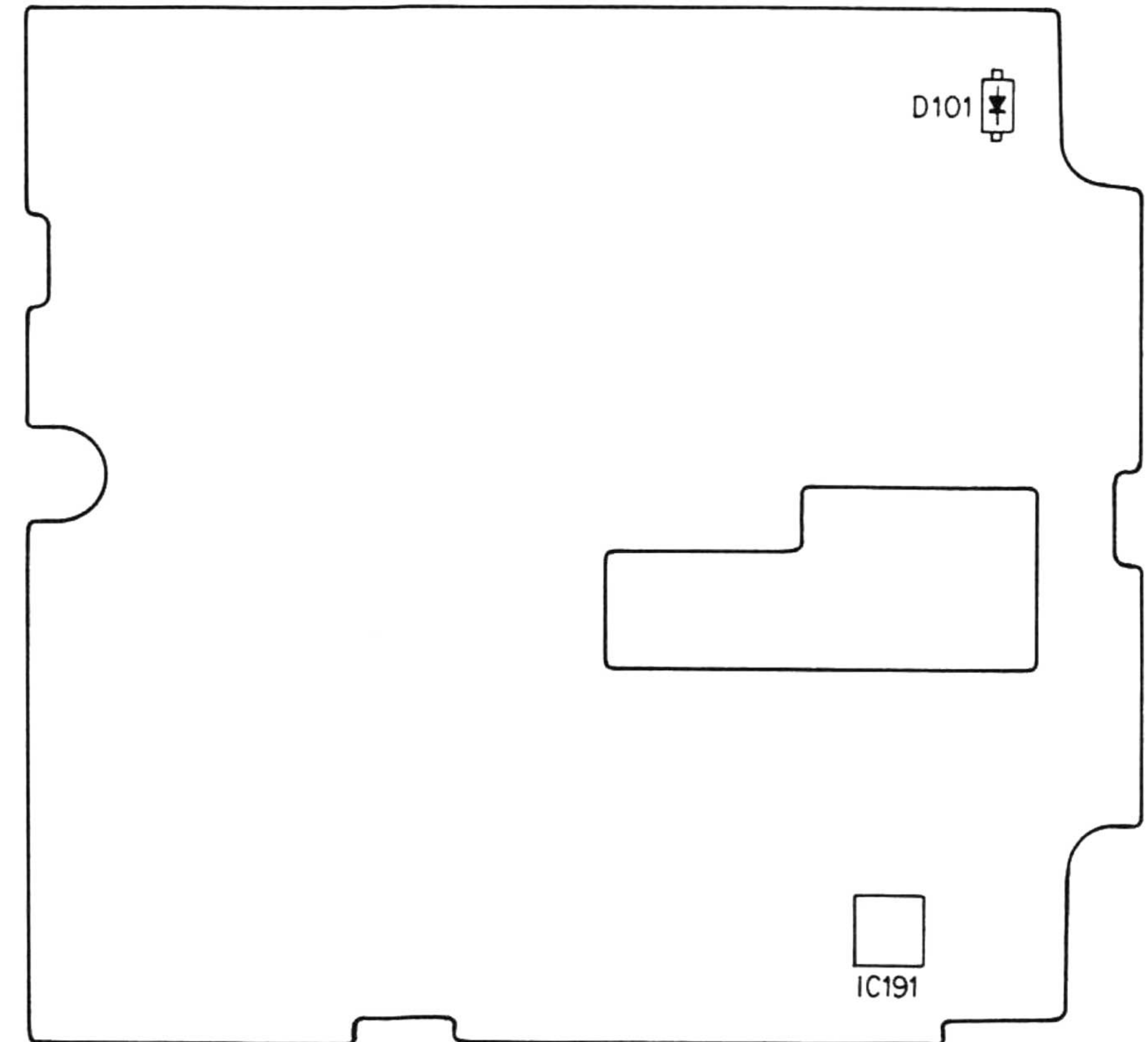
#### Checking Method :

1. Load a continuously recorded disc (Refer to "2-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES key twice and display "CPLAY MID".
4. Press the NO key when "CPLAY (0300)" is displayed.
5. Rotate the AMS knob and display "FBIAS CHECK".
6. Press the YES key and display "C1 = 0000 c = 00".  
The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.  
Check that the C1 error is below 50 and ADER is 00.
7. Press the YES key and display "C1 = 0000 a = 00".  
Check that the C1 error is not below 220 and ADER is not above 00 every time.
8. Press the YES key and display "C1 = 0000 b = 00".  
Check that the C1 error is not below 220 and ADER is not above 00 every time.
9. Press the NO key, next press the EJECT key, and remove the continuously recorded disc.

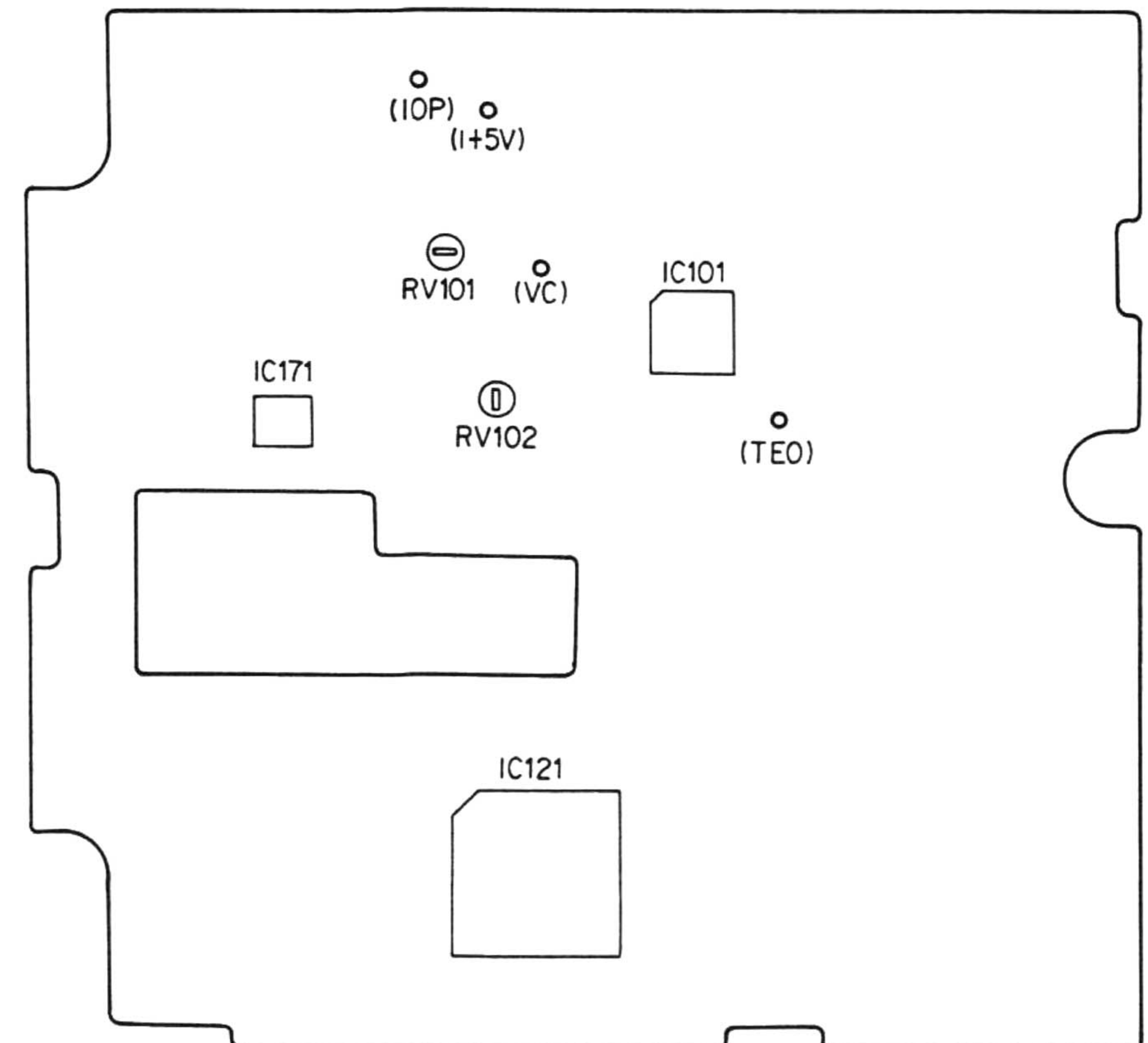
**Note 1:** If the C1 error and ADER are above 00 at points a or b, the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

## 2-11. Adjusting Points and Connecting Points

### [BD BOARD] (COMPONENT SIDE)



### [BD BOARD] (CONDUCTOR SIDE)





# SECTION 3 BLOCK DIAGRAM

